DRAWN WALL IRONED CAN FOR LIGHT COLORED FRUITS

This is a continuation-in-part of S.N. 09/618,435, filed July 18, 2000, the entire disclosure of which is hereby incorporated as if set forth fully herein.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates in general to packaging for foodstuffs, and more particularly to a tin-coated can for packaging certain light colored fruits and vegetables, such as pineapples, peaches and pears that require an exposed tin surface to maintain proper coloration.

2. Description of the Related Technology

The field of canmaking is generally subdivided into two-piece cans and their related technology, and that for three-piece cans. A two-piece can is characterized by a bottom end that is unitary with the sidewall of the can, and a separate top end that is secured to the sidewall. Most of the cans in which soft drinks are packaged today are two-piece drawn wall ironed (DWI) cans. A three-piece can, on the other hand, is characterized by a sidewall portion and separate top and bottom end that are fastened to the can body, usually by a double seaming process.

Certain light colored fruits and vegetables, such as pineapples, peaches and pears require an exposed tin interior can surface to maintain proper coloration. The tin material has long been known to have a bleaching effect on the fruit to prevent such discoloration. In the past, it has been typical to make packaging for such light colored fruits and vegetables with the three-piece can making process. The main reason for this is that it has generally been felt that the tin coating on tin-coated stock steel material would be unlikely to survive intact the manufacturing process that is used to manufacture DWI cans. In the typical manufacturing process for DWI cans, specialized presses known as body makers are used to draw cup-shaped metallic can blanks into

the elongated, thin can bodies with which consumers are familiar. During this process, an enormous amount of heat and friction is generated. Those who are skilled in the area of this technology and always assumed that the tin coating could not reliably be maintained on the interior wall of the can body during this process.

It is known to use DWI cans to package such products with an enamel material protecting the inside surface of the can body, but this is in general considered inferior to the standard three-piece can having the interior exposed tin surface.

A need exists for an improved packaging and method of packaging certain light colored fruits and vegetables using a DWI can, but without the disadvantages that are created by the application of an enamel coating.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the invention to provide an improved package and method of packaging certain light colored fruits and vegetables using a DWI can, but without the disadvantages that are created by the application of an enamel coating.

In order to achieve the above and other objects of the invention, a DWI can for packaging foodstuffs such as light colored fruits and vegetables includes a bottom; a sidewall integral with the bottom, the sidewall comprising a steel substrate, a first coating comprising tin on an outer surface thereof and a second coating comprising tin on an inner surface thereof, the second coating having a mass per unit area that is at least 30 pounds of tin per base box; and a top end secured to the sidewall.

According to a second aspect of the invention, a method of making packaging for light colored fruits includes steps of providing a base material having a steel substrate, a first layer of tin material on a first side of the substrate and a second layer of tin material on a second side of said substrate, forming the base material into a can body for a DWI can having a bottom surface and a sidewall comprising an exterior surface that has a first coating including tin and an interior

surface having a second coating also including tin, inserting foodstuffs into the can body so that the foodstuffs are exposed to the tin surface, and applying a top end to the can body.

These and various other advantages and features of novelty that characterize the invention are pointed out with particularity in the claims annexed hereto and forming a part hereof. However, for a better understanding of the invention, its advantages, and the objects obtained by its use, reference should be made to the drawings which form a further part hereof, and to the accompanying descriptive matter, in which there is illustrated and described a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a fragmentary cross-sectional view depicting a base material that is used according to a preferred embodiment of the invention;

FIGURE 2 is a fragmentary cross-sectional view depicting an intermediate blank that is used according to a preferred embodiment of the invention;

FIGURE 3 is a diagrammatical fragmentary cross-sectional view depicting a DWI can constructed according to the preferred embodiment of the invention;

FIGURE 4 is a fragmentary cross-sectional view depicting a sidewall of the DWI can shown in FIGURE 3; and

FIGURE 5 is a flowchart depicting a process that is performed according to the preferred embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Referring now to the drawings, wherein like reference numerals designate corresponding structure throughout the views, and referring in particular to FIGURES 1-4, a DWI can 10 that is constructed according to a preferred embodiment of the invention is best shown in FIGURE 3. As is conventional, the DWI can 10 includes a bottom 12 and a sidewall 14 that is unitary with the bottom 12. The assembled DWI can 10 will further include a top end

16, which is preferably applied to the upper end of the sidewall 14 through the conventional double-seaming process.

Looking now to FIGURE 1, it will be seen that the DWI can 10 is preferably fabricated from a base material 18 that includes a substrate 20 which is preferably fabricated from a ferrous material such as steel, a first layer 22 on a first side of the substrate 20 of a material that includes tin, and a second layer 24 of a material on a second side of the substrate 20 that also includes tin. Preferably, the first layer 22 is formed of tin, and is applied to the substrate 20 at a mass per unit area that is at least 0.50 pounds per base box (a thickness that is commonly referred to in the industry as "100 pounds" per base box stock thickness). More preferably, the layer of tin 22 is applied at a mass per unit area that is at least 0.60 pounds per base box (a thickness that is commonly referred to in the industry as "120 pounds" per base box stock thickness), and is most preferably applied so as to have a mass per unit area that is at least 0.675 pounds per base box (a thickness that is commonly referred to in the industry as "135 pounds" per base box stock thickness). Similarly, the second layer 24 is also preferably tin, and is preferably applied at a mass per unit area that is at least 0.10 pounds per base box (a thickness that is commonly referred to in the industry as "20 pounds" per base box stock thickness), and is more preferably at least 0.125 pounds per base box (a thickness that is commonly referred to in the industry as "25 pounds" per base box stock thickness). Most preferably, the second layer 24 is applied so as to have at least 0.15 pounds per base box (a thickness that is commonly referred to in the industry as "30 pounds" per base box stock thickness). Preferably, the first layer 22 is thicker than the second layer 24.

According to the well-known draw wall ironing process, the base material 18 is first formed into a cup-like blank 26, which is then drawn and ironed into the DWI can body that is depicted in FIGURE 3. In the preferred embodiment, this is accomplished by a series of a plurality of operations, including a first cupper operation that forms the base material 18 into a cup having the first layer 22 on an inside surface and the second layer 24 on an outside surface. A second wall ironer redraw operation follows, with the punch side of the ironer adjacent to the thicker first layer 22 and the die adjacent to the thinner second layer 24, and then the article is

further shaped by a cupper first iron operation. The article is then further stretched and formed in a wall ironer second iron operation and then by a cupper third iron operation. The article is then trimmed, flanged and beaded.

According to the preferred embodiment of the invention, the operations are performed so that the sidewall 14 of the resulting DWI can body 10 has minimal tin reduction on both the first, exterior tin coating 34 and the second, interior tin coating 36, and so that both coatings, and in particular the second interior thicker coating 36, remain unbreached and intact. The second coating 36 of tin material that is on the interior surface 28 is preferably attached to the substrate 32 of the sidewall 14 at a mass per unit area that is at least 0.15 pounds of tin per base box (a thickness that is commonly referred to in the industry as "30 pounds" per base box stock thickness). More preferably, the second coating 36 has a mass per unit area density of at least 0.20 pounds per base box (a thickness that is commonly referred to in the industry as "40 pounds" per base box stock thickness), and most preferably this mass per unit area density is at least .25 pounds per base box (a thickness that is commonly referred to in the industry as "50 pounds" per base box stock thickness).

After the can body is formed, there is no need to further applying any protective materials such as an enamel coating on to the interior surface of the sidewall 14.

After the body of the DWI can has been formed, it is filled with product, such as light colored fruits and vegetables, and then the container is sealed by applying the top end 16. The packaged product may then be shipped to the consumer, with the presence of the unbroken coating 36 of tin on the interior surface 28 of the sidewall 14 of the can 10 ensuring that the product will not darken prior to being used by the ultimate consumer.

It is to be understood, however, that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.